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FACULTY WORKING PAPER NO. 753


College of Commerce and Business Administration

University of Illinois at Urbana-Champaign

February 1981

Some Effects of Planning Aids and Presentation  
Media on Strategic Decision-Making

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## Abstract

The Devil's Advocate (DA) and Dialectical Inquiry Systems (DIS) have been offered as strategic decision-making aids and as improvements on the traditional Expert (E) approach to strategic decision-making. In this study, business students were given either the DA, DIS, E, or C (control) treatments and asked to develop a strategy for a fictitious company. Half the subjects received the treatments in written form and half received them via videotape. The results showed that the planning aids and presentation media produced differences in the number of strategic and functional area alternatives generated by subjects. Also, the DA reduced the effects of an "expert report" on subjects' strategic recommendations while the DIS did not.





# SOME EFFECTS OF PLANNING AIDS AND PRESENTATION MEDIA ON STRATEGIC DECISION-MAKING

## 1. INTRODUCTION

Strategic decision-making represents a special kind of ill-structured problem-solving [13]. For this reason, quantitative decision-making aids which have proved helpful with relatively well-structured problems are of limited use in strategic decisions. Such decisions may require more qualitative or behavioral assistance. One widely recommended behavioral decision-making aid is the Dialectical Inquiry System (DIS) [3], [11], [16], [19], [21].

Mason [16], elaborating on the work of C. West Churchman [3], first proposed the DIS as an aid to strategic planning and contrasted it with a Devil's Advocate (DA) approach. Both the DIS and DA are intended as improvements on the expert (E) approach in which strategic decisions are made with the aid of preliminary analyses and proposals by staff "experts." According to Mason, these proposals contain unstated assumptions and biases which remain unquestioned and may adversely affect the quality of a strategic decision. Carter [1] among others supports Mason's argument by outlining the factors which determine the amount and direction of bias in staff reports.

The DIS and DA are techniques for helping managers question the assumptions in staff proposals. The DIS as developed by Mason involves examination of the assumptions underlying an expert's proposal, the negation of these assumptions, and the development of a counterproposal based on the negated assumptions. The proposal and counterproposal are



then presented to decision-makers through a structured debate. The DA, on the other hand, involves the identification of assumptions and the development of a critique of these assumptions rather than a specific counterproposal. The proposal and critique are then presented to decision-makers in a debate format.

A number of authors in addition to Mason have recommended the DA as an ill-structured decision-making aid [4], [9], [12], [15]. However, Mason [16, pp. B407-B408] maintains that the DIS should be more helpful in strategic planning than the DA because it involves the development of a constructive alternative to the expert's proposal while the DA merely criticizes the proposal.

Field and laboratory research on these two decision-making aids has produced mixed and even contradictory results. Some studies have shown that the DIS has positive effects on strategy formulation while others have shown no effects for the DIS but positive effects for the DA. The present study provides new information on the specific effects of the DA and DIS on strategic decision-making. The results of the present study also provide some clues regarding the reasons for the discrepant findings of earlier studies.

## 2. PREVIOUS RESEARCH ON THE DIS AND DA

The DIS has been used as an aid to strategy formulation in a number of field experiments. Mason [16] studied the effects of the DIS on strategic decision-making in an abrasives manufacturing company. He obtained a strategic planning document from the company's planning department, identified its ten underlying assumptions, and constructed a



counterplan based on opposite assumptions. The plan and counterplan were then presented to management in a structured debate. Mason reported that the company's managers were able to form a "new, encompassing view" of the planning problem and were more satisfied with the strategy they developed as a result of using the DIS.

Mitroff, Barabba, and Kilmann [20] used the DIS on a planning problem at the Bureau of the Census in Washington, D.C. Census Bureau employees were given a lecture on the DIS and were then clustered into five homogenous groups. These groups then produced planning reports suggesting new future directions for the Bureau. The reports differed significantly from one another. Finally, representatives from each group formed an executive group which produced a final integrative report. According to Mitroff et al., this report contained several issues and alternatives which were innovative and exciting.

Emshoff and Finnel [10] developed a more detailed procedure for applying the DIS to strategic planning which they called Strategic Assumption Analysis. They examined the effects of this procedure in a company which they called Basic Materials. A planning group at the company used the DIS to revise a strategic plan they had developed. Emshoff and Finnel concluded that the DIS assured a more thorough analysis of the data and produced a revised strategy which was superior to the initial strategy [10, p. 30].

The DIS was applied by Mitroff, Emshoff, and Kilmann [21] to a pricing decision in a drug company. Three groups of managers, each advocating a different pricing policy, used the DIS to examine their divergent assumptions and arrive at a final pricing policy. The authors





reported that the DIS produced more and better alternatives and led to a different pricing policy than the one which would have been chosen had the DIS not been used.

In summary, those conducting the field research on the DIS have claimed that its use leads to a broader, more encompassing view of a planning problem; that it helps them focus on strategic, company-wide problems rather than functional area problems. If so, this would make the DIS a very valuable aid to strategic decision-makers suffering from what McNichols calls "functional emotionalism." According to McNichols:

The skills and abilities learned at the functional level may, in many instances, prove to be among the greatest handicaps of executives in their attempts to adapt to the overall viewpoint so necessary to the policymaker. It is not uncommon for top managers, particularly in the initial stages of their role as policymakers, to suffer from functional emotionalism--they may tend to see many corporate problems as stemming from poor financial policy, a failure to apply the "marketing concept," or ignorance of the ramifications of production difficulties. Others, trained and experienced in different specialties, may tend to approach the decision-making process through their own familiar channels. The tendency toward functional emotionalism is not unusual or unexpected in view of the career path of most executives. Their education, job assignments, and development are frequently directed toward a functional specialty. [17, pp. 5-6]

The DIS proponents have also claimed that it leads to the generation of more strategic alternatives and may change the final choice of a strategy.

These field experiments provide some support for the effectiveness of the DIS. They demonstrate that in some cases the DIS leads to the generation of more alternative strategies and a different strategic choice. However, these experiments contain a number of uncontrolled variables and confounding factors which limit the generalizability of



the results. Further, none of the field studies involve a direct comparison of the DIS to the DA. A number of laboratory studies have been designed to address these weaknesses in the field studies.

Cosier [4] developed E, DA, and DIS treatments for a laboratory setting and measured their effects on performance at a multiple-cue probability learning task. The task required individuals to predict criterion values from cues having a probabilistic relationship to the criterion. Subjects in Cosier's experiment predicted Price/Earnings ratios (the criterion) for a fictitious company from three pieces of financial data (the cue values). Subjects in the E condition received a planning report from an "expert" recommending that they give most weight to cue #1, some weight to cue #2, and least weight to cue #3 in making their predictions. Subjects in the DA condition received this same "expert" report plus a critique which questioned the assumptions of the first report but offered no alternative recommendations, a treatment incorporating the essential elements of the DA as described by Mason [16].

Subjects in the DIS condition were given the "expert" report plus a counterproposal. The counterproposal recommended that cue #3 receive most weight, cue #2 moderate weight, and cue #1 least weight. Thus, this treatment incorporated the essential elements of the DIS [3], [16], [19].

All subjects made twenty predictions in each of three distinct contexts or "states of the world." In the first world state, the cue-criterion relationship was consistent with the recommendations of the expert report. In the third world state, the relationship was consistent with the counterproposal. The second world state represented a compromise between the proposal and counterproposal.



The dependent measure in this study, and all subsequent laboratory studies on the DA and DIS, was the mean absolute prediction accuracy:

$$\Sigma \frac{\left| \begin{array}{cc} \text{Predicted} & \text{Actual} \\ \text{Price/Earnings} & \text{Price/Earnings} \\ \text{Ratio} & \text{Ratio} \end{array} \right|}{20}$$

Cosier found that in the third world state (counterproposal best), the DA subjects made significantly more accurate predictions than the E or DIS subjects. Thus, the results of this study tended to favor the DA.

Later laboratory studies by Cosier, Aplin, Ruble, and Schwenk, using a similar experimental design, have generally favored the DA over the DIS [5], [8], [23]. However, the prediction task used in these studies does not adequately capture the full complexity of the strategy formulation task. Though prediction or forecasting may be an important part of strategy formulation, it is only one subcomponent of the process.

Cosier and Aplin [7] extended previous comparative research by examining the effects of the DA and DIS on strategy formulation. Planners with the United Way of America served as subjects and were randomly assigned to either the E, DA, DIS, or C (control) conditions. All planners were given a case describing a particular United Way agency and asked to develop a planning document for the agency. Planners in the E condition also received an "expert" proposal recommending a course of action for the agency based on analysis of the case data. Those in the DA condition received the proposal plus a critique while those in the DIS condition received the proposal plus a counterproposal based on different analysis and assumptions. The C subjects received nothing beyond the case.





The planners' recommendations were evaluated by judges along several dimensions proposed by Tilles [26]. These included: internal consistency, consistency with the environment, appropriateness in light of available resources, appropriate degree of risk, appropriate time horizon, workability, and an overall dimension. The evaluations of the recommendations generated by the DA planners were higher than the evaluations of those generated by the DIS planners on all seven evaluative dimensions, though this difference was only significant for one of the dimensions.

In summary, then, the comparative research on the DA and DIS has not supported the claims of the field researchers regarding the benefits of the DIS. Rather, it has shown that the DA is superior to the DIS in improving prediction performance and in improving overall quality of strategic recommendations. However, this research has not addressed some of the major claims made for the DIS by the field researchers. Specifically, comparative research has not examined the effects of the DA and DIS on the generation of strategic alternatives, the choice of a final recommendation, and the creation of a "broad, encompassing view of the problem" on the part of managers.

Examination of the effects of the DA and DIS on generation and choice of alternatives may help explain the differences in results between the laboratory and field studies. There is also one important difference between the field studies on the DIS and the comparative studies which has not yet been addressed. In the field studies, the DIS was given to managers verbally through face-to-face indoctrination lectures while in the comparative studies, the DA and DIS treatments



were presented to subjects in written form. It may be that verbal presentation of the DIS through an indoctrination lecture enhances its effects. On the other hand, it may be that the DA is more effective when presented to managers in written form accompanying written staff analyses or recommendations. This speculation is supported by evidence from communications research which suggests that the medium through which information is presented influences its effects on problem-solving [2], [22], [27].

The present study examined the effects of the DA and DIS on the generation of alternative strategies and the final choice of a strategy. A new factor was also examined in this study, medium of presentation of the planning aids.

### 3. METHOD

Eighty upper division undergraduate business students participated in the study. All subjects had completed coursework in the areas of finance, marketing, production, and management. They all had received experience in case analysis through a major project which required them to analyze an integrative case and develop recommendations for the company it described. At the time of the study, all subjects were enrolled in a management course in which the principles of strategic planning were discussed. Thus, all subjects had some level of sophistication in business policy case analysis.

Each subject received a copy of a case developed for this study which described a fictitious company in the soft drink industry. The case dealt with the company's environment, strengths and weaknesses, and central problems. Two alternative strategies were proposed for the



company: the acquisition of a winery and the development of a new soft drink. The case contained information relating to the feasibility of each of these alternatives.

Subjects were randomly assigned to one of four groups, the C (control), E, DA, and DIS groups. Twenty subjects were assigned to each group. Those in the C group received no additional materials beyond the case. Those in the E condition received a "planning committee report" which contained an analysis of the issues and data in the case and recommended acquisition of the winery. This report was based on the assumption that diversification out of the soft drink industry was necessary and it interpreted case data in a manner consistent with this assumption.

Subjects in the DA condition received this same report plus a critique from a second "planning committee" which questioned the analysis, assumptions, and recommendations in the first planning committee report but offered no alternative recommendations. This treatment represents the essential features of the DA as described by Mason [16]. Subjects in the DIS condition received the first planning committee report plus a second planning committee report based on alternative analyses and assumptions which offered a different recommendation. This second report was based on the assumption that specialization within the soft drink industry was necessary and recommended the development of the new soft drink. This treatment represents the essential features of the DIS as described by Mason and others [3], [16], [19].

To allow examination of the effects of presentation on, half the subjects received the treatments via videotape while the other half





received them in written form. The two planning committee reports and the critique were presented by two MBAs and recorded on videotape. Research on instructional media [22], [28] indicates that videotape and face-to-face presentation of planning information should have similar effects on problem-solving. Therefore, videotaped rather than live presentations were used to ensure experimental control. The videotape reports and critique were combined in the same way as were the written reports to form the E, DA, and DIS treatments. The design of the experiment is represented in Table 1.

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insert Table 1 about here  
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All subjects were asked to prepare a planning document which included:

- A) A list of alternative courses of action for the company.
- B) The alternative they would recommend for the company (one of the two listed in the case or one of their own).
- C) A specific set of recommendations for the implementation of their chosen alternative.

#### 4. RESULTS

If the DIS does increase strategic focus, we would expect that it should reduce functional emotionalism and the tendency to deal only with specific functional area problems in strategic decision-making. If so, the DIS should increase the number of strategic alternatives and reduce the number of functional area alternatives generated by decision makers.

To test these assertions, the alternatives generated by the subjects were divided into two categories. The first category was labeled "strategic alternatives" and included alternatives addressing company-wide issues, those which had implications for more than a single



functional area. These have been called "master strategies" and "mixed strategies" in the literature [13, p. 91; 25, p. 239]. The two alternatives listed in the case (acquisition of the winery and development of the new soft drink) are examples of alternatives in this category. The second category included alternatives which dealt with only a single functional area. These have been called "pure strategies" and "functional area strategies" in the literature [13, p. 91; 25, p. 239].

A special type of ANOVA [29, pp. 468-473] was done to examine the effects of planning aids and presentation media on the number of strategic alternatives generated by subjects and to include the control group. The control group represents one level of the planning aid factor (no planning aid) but the two categories of the presentation medium factor were not represented in the control group. This special ANOVA makes it possible to include the control group as one level of the planning aids factor but not the presentation medium factor. The results of this ANOVA are presented in Table 2.

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insert Table 2 about here  
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A planning aid by medium interaction was found. A subsequent simple-effects ANOVA showed no effect for type of planning aid when the planning aids were presented via videotape. However, a simple-effects ANOVA and subsequent Post Hoc tests showed that subjects given the DA in written form generated significantly more strategic alternatives than the subjects given the E or DIS in written form.

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insert Table 3 about here  
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An ANOVA was also performed on the functional area alternatives generated by subjects. This analysis revealed a planning aid by medium interaction and an effect for the control group vs all others.

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insert Table 4 about here  
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Subsequent simple effects ANOVAs and Post Hoc tests revealed that the C subjects generated more functional area alternatives than any other group.

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insert Table 5 about here  
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This indicates that subjects given no planning assistance tend to focus on the generation of solutions to functional area problems. Subjects given the DIS and E via videotape and subjects given the DA in written form generated significantly fewer functional area alternatives. This result indicates that these treatments significantly reduced the tendency for subjects to generate functional area alternatives. Finally, subjects given the DA in written form generated significantly fewer functional area alternatives than those given the DA via videotape.

This study also examined the effects of the E, DA, and DIS on choice of recommendations. Judges (doctoral students in management) assigned the subjects' recommendations to one of four categories. These were:

- 1) The acquisition of the winery
- 2) The development of the new soft drink
- 3) Both 1 and 2
- 4) Some other alternative





Two judges classified each alternative. In sixty-two cases, both judges agreed in their classification. In the remaining eighteen cases, the experimenter determined the correct classification. Table 6 shows the number of subjects who chose recommendations in each category.

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insert Table 6 about here  
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A chi-square analysis on this data revealed that subjects' final recommendation depended on the type of planning aid they received

( $\chi^2 = 17.36$ ,  $p < .05$ ) [24].

The power of the first planning committee report (recommending the winery acquisition) was demonstrated by the difference in choice between the E and C subjects. The alternative most frequently chosen by the C subjects was the development of the new soft drink. However, the E subjects, who received the planning committee report recommending the acquisition, chose the acquisition alternative most frequently. Thus, this report caused subjects to choose a different alternative than they would given no planning assistance.

According to Mason [16] the E condition represents the common or traditional approach to strategy formulation. Mitroff's [21] claim that the DIS should lead to a different strategic choice than the traditional E approach was not supported by this research. The DIS subjects' most frequently chosen alternative was the same as that of the E subjects. However, the DA subjects most frequently chose the soft drink development, indicating that the DA critique was effective in reducing the influence of the first planning committee report.

A second chi-square analysis revealed no effects for media on choice of recommendation ( $\chi^2 = 6.67$ ,  $p < .05$ ).



## 5. DISCUSSION

The results of the present study have refined our understanding of the effects of two widely-recommended decision-making aids: the DIS and the DA. Claims that the DIS encourages a strategic focus, reduces the influence of expert reports, and promotes the generation of strategic alternatives were not supported. However, the results showed that the way the DIS and DA are presented influences their effectiveness.

In strategic planning sessions in which staff reports are presented "live" to decision-makers, as they were in the field studies, the DIS may have some positive effects. It appears to reduce functional focus--as demonstrated by the fact that the videotape-DIS subjects generated fewer functional area alternatives than the C subjects. However, it does not reduce functional focus more than the videotape-E approach. Further, it does not increase the generation of strategic alternatives. The DA, on the other hand, appears to have positive effects when staff analyses are presented in the form of written memos and reports. Here, the DA reduces functional focus and encourages the generation of more strategic alternatives than either the E or the DIS.

Alternatives generation is a crucial part of strategy formulation and ill-structured decision-making in general. The quality of the alternatives generated can determine the quality of the strategic recommendations. The results of this study provide the basis for a dual recommendation on the choice between the DA and DIS. Managers wishing to improve the quality of strategy formulation should choose the DA and it should be presented in written form rather than "live."



These results also have implications for the difference in results between the field studies, where the DIS was presented "live", and the laboratory studies, where the DA and DIS were presented in written form. It may be that the positive effects of the DIS in the field studies were partly due to its live presentation. Further, it may be that the superiority of the DA in the laboratory studies would have been less pronounced if the DA and DIS had been presented live or via videotape rather than in written form. Future research on the DA and DIS should include an examination of the media through which they are presented.

The results of this study did not support the claim that the DIS reduces the influence of an expert report on decision-makers' choice of a recommendation. The E subjects chose the alternative recommended by the first planning committee report most frequently while the C subjects, who did not receive this report, most frequently chose the other alternative described in the case. This demonstrates the influence of the first planning committee report on the E subjects. The DIS subjects most frequently chose the same alternative as the E subjects while the DA subjects tended to choose the other alternative. Thus, the DA seems to be more effective than the DIS at reducing the influence of an expert report. Managers concerned about potential biases in staff analyses used in strategy formulation should be encouraged to choose the DA over the DIS as the best way of reducing the effects of these biases on their decisions.

Though this study provided new insights into the effects of the DA and DIS, it left at least one important question to be dealt with in future research: Why is the DA more effective than the DIS? Reason [16,



pp. B407-B408] has suggested that one of the weaknesses of the DA is that it provides no alternatives to the expert's proposal it criticizes. However, this may actually be a strength of the DA rather than a weakness. By specifying no alternatives, the DA may force decision-makers to generate their own, resulting in a stronger strategic focus and the generation of more strategic alternatives than would occur with the DIS.

Further, the DA may appear to decision-makers as a more sensible approach than the DIS. Decision-makers receiving the DIS may wonder how two "experts" could develop two opposing recommendations based on the same data. This might lead them to question or reject the DIS analyses. The DA, on the other hand, merely asks subjects to question an "expert's" assumptions and carefully reconsider them. This allows decision makers to modify some assumptions and retain those which seem reasonable.

Of course, these explanations for the effects of the DA and DIS are speculative. Future research could test these speculations by examining the effects of the DA and DIS on problem-solving processes used by subjects. Some form of protocol analysis would be an appropriate methodology for such research.





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Table 1

Design of Experiment

		Planning Aid			Control
		E	DA	DI	
Presentation Medium	Written	10*	10	10	20
	Videotape	10	10	10	

\* Number of subjects per cell



Table 2

## Anova For Number of Strategic Alternatives

Source of Variation	Sum of Squares	df	Mean Squares	F
Between Cells	17.30	6		
Planning Aid (including control group)	5.05	3	1.68	1.23
(A) Planning Aid (without control group)	4.90	2	2.45	1.79
Control vs. All Others	.15	1	.15	.11
(B) Presentation Media	.82	1	.82	.60
A x B	11.43	2	5.72	4.18*
Within Cells	100.25	73	1.37	
Total	117.55	79		

\*p &lt; .05



Table 3  
Mean Differences

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Planning Aid	Mean Number of Strategic Alternatives
E	* 2.8
DA	4.2 *
DI	2.8

\*p < .05



Table 4

## Anova For Number of Functional Area Alternatives

Source of Variation	Sum of Squares	df	Mean Squares	F
Between Cells	85.75	6		
Planning Aid (including control group)	37.25	3	12.42	2.21
(A) Planning Aid (without control group)	.43	2	.22	.04
Control vs. All Others	36.25	1	36.82	6.55*
(B) Presentation Medium	.27	1	.27	.05
A x P	48.23	2	24.12	4.29*
Within Cells	410.20	73	5.62	
Total	495.95	79		

\*p &lt; .05





Table 5

## Cell Means For Number of Functional Area Alternatives

Videotape	Cell Mean
(E)	* 1.0
(DA)	2.8 *
(DI)	* .9
Written	
(E)	2.5
(DA)	.4 *
(DI)	2.2
Control	3.2

\*p &lt; .05



Table 6

Alternative Chosen by Type of Planning Aid

Alternative		Planning Aid			
		E	DA	DIS	C
	Winery				
	Aquisition	7*	2	19	4
	Soft				
	Drink	4	11	5	12
	Both				
	1 and 2	3	1	2	0
	Some Other				
	Alternative	6	6	3	4

\*Number of subjects choosing this alternative.













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